Geothermal Energy Program

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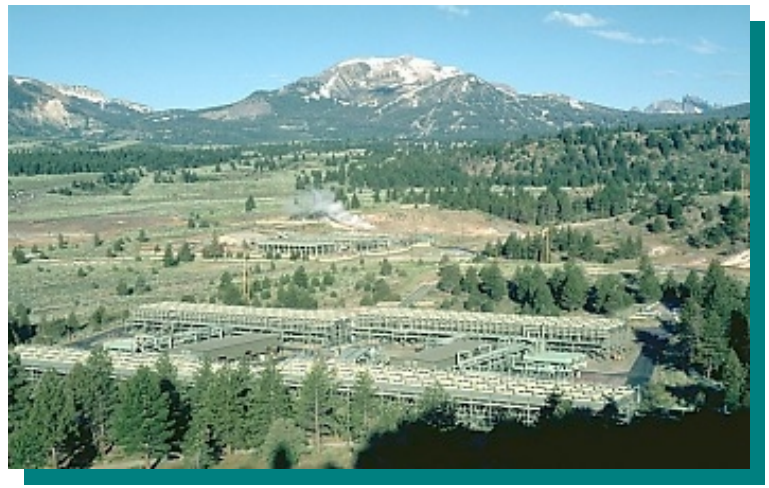
Cost of Energy Trend

Geothermal Energy Program

1985: 15-16 cents/kWh

2000:
5-8 cents/kWh

- More industry experience
- Improved technology
- Economies of scale
- Reduced cost of finance



Mammoth Pacific Geothermal Facility

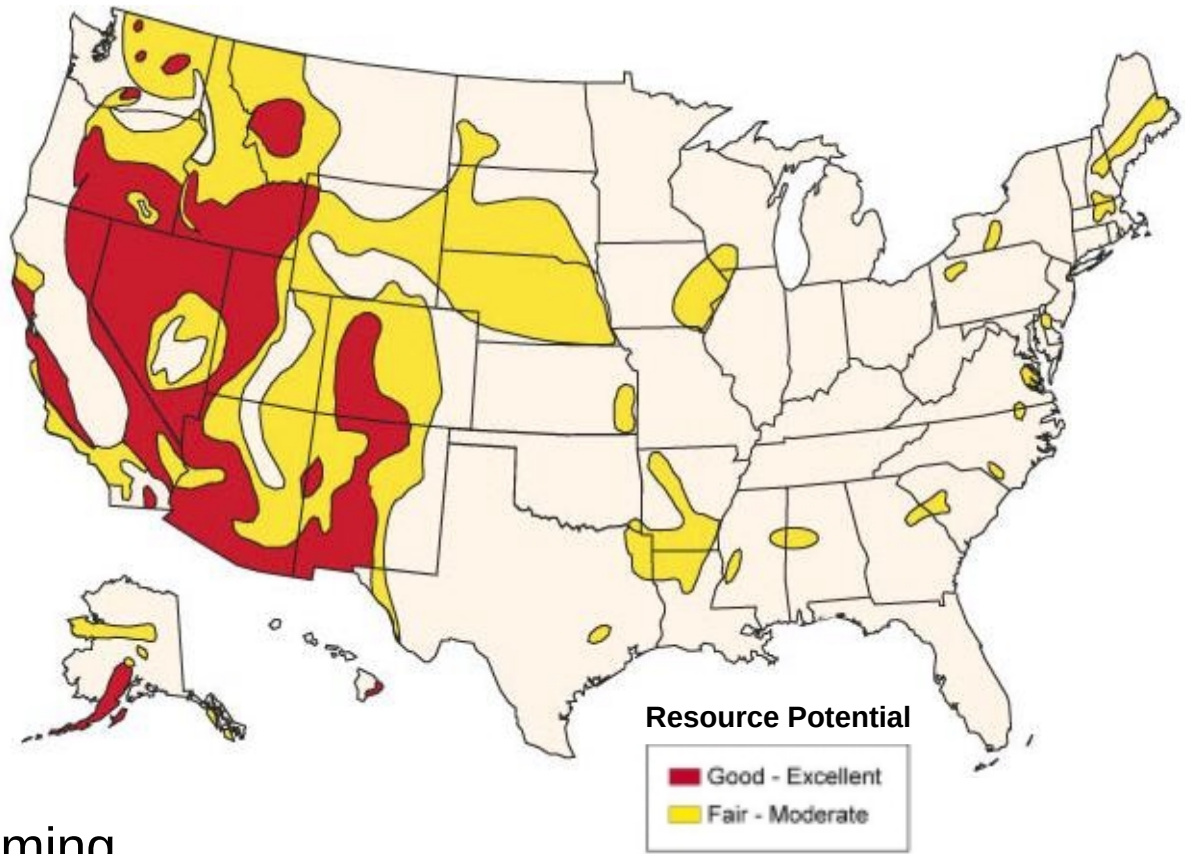
2003: 4-6 cents/kWh

Geothermal Energy Potential

Geothermal Energy Program

Electric Generation Potential

- Top 3 States:
  - Nevada
  - California
  - Utah
- Other High Potential States:
  - Idaho, Hawaii, New Mexico, Oregon, South Dakota, Texas, and Wyoming



Temperatures and Applications

Geothermal Energy Program

Low Temperature (~100º C)
District Heating
Process Heat
Aquaculture

Intermediate Temperature (~100-175º C)
Distributed Power
Process Heat

High Temperature (>175º C)
Central Station

Current U.S. Policy Emphasis

Geothermal Energy Program

- Investment Tax Credit
- National Renewables Portfolio Standard
- Innovative R&D
- Cost-Sharing Technology Partnerships
- National Initiative: GeoPowering the West

GeoPowering the West

Geothermal Energy Program

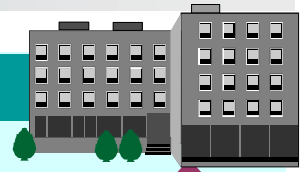
"Geothermal power is a clean, reliable and renewable energy source available in all western states…. We are confident that this initiative will help to increase the power produced by this existing resource and make it a major contributor to our clean energy mix."

Bill Richardson, Secretary of Energy

- Announced January 2000
- 10% of the electricity use of 19 Western states by 2020
- Seven million homes using geothermal energy by 2010
- Double the states with geothermal facilities to eight by 2006

Program Roles

Geothermal Energy Program



National Laboratories

Geoscience and Supporting Technologies

Core research
Exploration
EGS

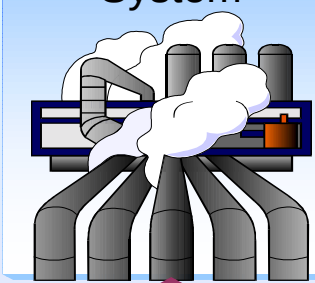
Innovative subsystems

Diagnostics while drilling

GeoPowering the West

Advanced Plant Systems

Geothermal System



Drilling Research

Energy Systems Research

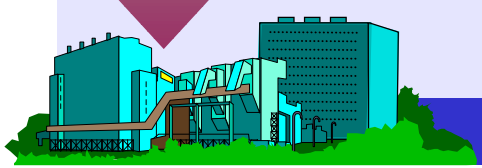
Near-term technology development

Field Verification

Industry Support

Industry Partnerships

University Research



U.S. Industry

Participating National Laboratories

Geothermal Energy Program

Core

Idaho National Engineering and Environmental Laboratory

Sandia National Laboratories

National Renewable Energy Laboratory

Support

Lawrence Berkeley Laboratory

Lawrence Livermore Laboratory

Los Alamos National Laboratory

Brookhaven National Laboratory

Oak Ridge National Laboratory

World's Largest Geothermal Development – The Geysers

Geothermal Energy Program

- Located north of San Francisco, California
- Total installed capacity is 1,224 MWe
- Largest single green power source in California
- Satisfies 2.2% of state's electricity needs